

### **REMARKS**

The present response is intended to be fully responsive to all points of objection and/or rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Applicant asserts that the present invention is new, non-obvious and useful. Prompt consideration and allowance of the claims is respectfully requested.

### **Status of Claims**

Claims 1-42 are pending in the application. Applicant reserves all rights in these claims to file divisional and/or continuation patent applications

Claims 1-38 have been rejected by the Examiner. Claims 1, 3, 7, 8, 10, 14, 15, 18, 22, 24, 25, 28-30, 32, 35, 37 and 38 have been amended. Claims 4, 6, 11, 13 and 33 have been canceled. Claims 39-42 have been added.

Applicant respectfully asserts that the amendments to the claims add no new matter.

### **SPECIFICATION AND CLAIM OBJECTIONS**

The disclosure was objected to for the reasons set forth on page 3 of the Office Action. Applicant has amended the specification herein and these objections are now moot and should be withdrawn.

Claims 35 and 36 were objected to for the reasons set forth on page 3 of the Office Action. Claim 35 has been amended herein to be dependent on claim 1 and claim 36 is dependent on claim 35. In view of these amendments the objections are moot and should be withdrawn.

### **CLAIM REJECTIONS**

#### **35 U.S.C. § 112, second paragraph Rejections**

Claims 1-38 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant

regards as the invention. The following claim terms were pointed out in the Office Action and Applicant addresses herein below:

1. "robust"
2. "deleterious traits"
3. "average content in currently available varieties"

The Office Action states that these terms are considered as relative terms lacking a comparative basis. Applicant respectfully traverses this rejection in view of the remarks that follow.

**1. "robust"**

It is the Applicant's assertion that the definition of the term "robust" cited in claim 1 is well known in the conventional relevant art. For example, a recent publication of Ruoyu Luoabc et al., (2009): *Photosynthetic metabolism of C3 plants shows highly cooperative regulation under changing environments: A systems biological analysis*, in the academic journal PANS, investigated robustness of photosynthetic metabolism in the chloroplasts of C3 plants under drought stress and at high CO2 concentration conditions. This publication provides the acceptable definition of the term robustness, as follows:

*"As a general definition, **robustness is a property that maintains system function in the face of various perturbations** (13, 14). **It is one of the inherent properties of biological systems**. In particular, aspects of the mechanism and the origin of robustness have been investigated, for instance, the topology of networks such as the bow-tie structure of biological systems (15), feedback control (16), robustness tradeoffs such as Highly Optimized Tolerance (HOT) theory (17), duplication of pathways (18), and decoupling pathways (19). **More recently, Kitano has suggested how to describe the robustness of biological systems quantitatively** (20)."*

It is further emphasized that the authors of this publication state that a tentative quantitative definition of robustness has been suggested only recently (Kitano H, 2007, towards a theory of biological robustness. Mol Syst Biol 3:137), well after the first publication of the

current application which is Jan. 29, 2004. Thus robust is a well known term to describe a healthy, vigorous and sturdy plant. The present application provides robust tomato hybrids, homozygous for the dg mutation, devoid of the undesirable pleiotropic traits associated with this mutation as disclosed in the citation that follows (spec. of WO 2005/072515):

*"Within the scope of the present invention the term hybrid varieties encompasses any robust hybrid variety that is homozygous for the dg mutation devoid of the traits poor germination rate, shallow root system, brittle stems, thin and/or fragile leaves, premature defoliation, low yield and small fruit. "*

p. 4, l. 13-16

The present application further defines the claimed tomato hybrids as **vigor, hardy and adapted for growth on a commercial scale**, as demonstrated in the following citations:

*"The F1 hybrid varieties of the present invention are superior over the parent lines in their plant vigor and adaptation for growth in a commercial scale, including field resistance to various diseases and better yield."*

p. 4, l.21-23

*"The novel varieties of the present invention including parental lines or hybrids adapted for commercial cultivation produce commercial scale crop yields, in which the average lycopene content is at least 200 ppm."*

p. 5, l. 23-26

*"Step 5: Further selection was performed by the following sequential steps:*

*a) Each breeding line was examined for average performance, including: lycopene content, volume of root system, vigor, fruit size and fruit yield, leaf*

*appearance and health and total soluble solid content (TSS/BRIX). Breeding lines showing the highest results were selected for further analysis."*

p. 11, l. 7-12

*"Plant quality, scored according to the followings: **vigor**, plant resistance to various diseases, plant resistant to stress, foliage health and density, unity of ripening and fruit quality at ripening."*

p. 12, l. 4-6

*"The present invention relates to **hardy** tomato varieties, producing high lycopene fruit for the fresh fruit market as well as for the tomato processing industry. Specifically, the present invention relates to **hardy** tomato varieties homozygous for the dg mutation, producing fruit comprising an average lycopene content of at least two fold its content in currently available commercial varieties, while devoid of undesirable traits hitherto linked to the dg mutation."*

p. 3, l. 20-29

*"The present invention now discloses novel, **hardy** hybrid tomato varieties which are dg homozygous, comprising a very high lycopene content while being devoid of the undesired pleiotropic effects associated with the dg mutation."*

p. 8, l. 31-32; p. 9, l. 1-2

Thus, the definition of the term "robust" and terms cited in claim 1 are well known in the conventional relevant art.

## 2. "deleterious traits"

With respect to the term deleterious traits, it is the Applicant's view that this term is an acceptable term that is **commonly understood by tomato breeders** (one skilled in the art) in the field, without necessarily defining it quantitatively. The pleiotropic deleterious traits known to be linked with the *dg* mutation and listed in claim 5 of the present application, namely poor germination rate, shallow root system, brittle stems, thin and/or fragile leaves, premature defoliation, low yield, and small fruit are understood by persons in the art **without necessarily having them defined quantitatively**. In other words, any tomato breeder knows what is meant by these terms *per se* as applied to attempts to breed commercial plant varieties. In fact, the Applicant attaches to this document, official guidelines administered by the Ministry of Agriculture of the State of Israel that are directed to breeders of tomato crop varieties (Appendix I).

These guidelines provide the breeders with parameters to qualitatively estimate tomato varieties. The tomato varieties tests encompass **visual evaluation** of parameters such as endogenous color, presence of veins, jelly, hollowness, "shoulder", vegetative growth, leaf cover of the fruit, disease resistance, fruit shape, general color, hardness/ solidness of the fruit, healthiness of the plant and pulp/flesh color. It should be emphasised that these parameters are **visually evaluated in the field** by tomato breeders and they are **qualitatively scored by a relative scale** (i.e. poor, high, soft, weak, few, many, solid, good and medium) as presented in the Table 2 of Appendix I. The subsequent conclusion of considering all these visual estimations is a general evaluation with respect to the determination if the crop yield of the specific variety is suitable for **commercial use**. Thus in view of the above it can be concluded that the terms listed in claim 5 are acceptable as objective parameters for determining plant quality and adaptation of a field crop such as tomato for growth on a commercial scale (Appendix I). The high lycopene tomato varieties of the present application, exemplified by hybrid HA3518, are devoid of the deleterious traits listed in claim 5 and as a result perform a high crop yield (between about 9 kg/m<sup>2</sup> and 12.7 kg/m<sup>2</sup>), and comprise fruits with high Brix value of about 4.5 (Examples 1 and 2).

Applicant further provides an expert Declaration under 37 CFR 1.132 of Peleg that supports the data and arguments detailed above (see Appendix II). In the Declaration under 37 CFR 1.132 it is stated by an experienced tomato breeder that the term "deleterious traits" cited in claim 1 is used in the respective art (i.e. Cornelius S. B et al., PANS, 2006, see p.7927-7928; Sacks E.K. and Francis, D.M. 2001. J. Amer. Hort. Sci. 126(2):221-226, see p. 222; Jarret RL et al., J. Amer Soc. Hort. Sci 109: 873-878; Thompson AE 1961 Proc. Amer. Soc. Hort.Sci 78: 464-473) and is understood by persons in the art without necessarily having them defined quantitatively. It is further stated that the *dg* associated deleterious traits such as brittle stems, fragile leaves and small fruit claimed in claim 5, are conventional terms used by ordinary tomato breeders to describe plant quality and presence of undesirable effects.

In view of the above, Applicant respectfully submitted that the term "deleterious traits" is a well understood term and particularly pointed out in the specification. Thus, one skilled in the art would understand the metes and bounds which Applicant regards as the invention.

### 3. "average content in currently available varieties "

Applicant has deleted this phrase from the claims and replaced it with the phrase "value of lycopene content" as cited in claim 4, within the fruits of the homozygous *dg* hybrid tomato varieties claimed in claim 1. Claim 4 has been canceled. Thus, amended claim 1, now states that the lycopene content concentration as follows:

*"A robust, hardy, vigorous tomato variety adapted for growth on a commercial scale, homozygous for the *dg* mutation, wherein tomatoes grown from this variety have an average lycopene content of at least 200 ppm plus or minus the standard error from the mean, while being devoid of deleterious traits associated with the *dg* mutation, when measured at peak lycopene content."*

In view of the above amendments and arguments, Applicant respectfully requests that this rejection be withdrawn.

### 35 U.S.C. § 112, first paragraph Rejections

Claims 6, 7, 13, 14, 26 27, 33 and 34 were rejected by the Examiner as failing to comply with the written description requirement under 35 U.S.C. § 112, first paragraph, for the reasons set forth on pages 5-7 allegedly being unclear whether a deposit of seeds claimed in the present application has been made.

Applicant respectfully points out that a deposit under the terms of the Budapest Treaty has been made. The Applicant has deposited with the ATCC 2500 seeds of tomato hybrid designated HA3518 (Accession No. PTA-5796), on January 29, 2004. Complying with the Examiner's demand, the Applicant provides herewith documents verifying said deposit as well as a Declaration by the Applicant that the seeds were deposited under the Budapest Treaty terms (Appendix III).

Furthermore, claims 6, 13 and 33 have been canceled.

Claims 1-5, 8-12, 15-25, 28-32 and 35-38 were rejected under 35 U.S.C. § 112, first paragraph, on the grounds that the specification, while being enabling for deposited variety HA3518, does not reasonably provide enablement for any tomato plant in scope with the claims. Applicant respectfully traverses and asserts that the present application meets the enablement requirements for the following reasoning:

First, Applicant has now narrowed the scope of claim 1 to a "**robust, hardy, vigorous tomato variety adapted for growth on a commercial scale**", characterized by homozygosity for the dg mutation, "*wherein tomatoes grown from this variety have an average lycopene content **of at least 200 ppm plus or minus the standard error from the mean**, while being devoid of deleterious traits associated with the dg mutation, when measured at peak lycopene content.*"

The specific lycopene content cited in amended claim 1 is disclosed and demonstrated in the application (i.e. Example 1). In the specification of the filed application Hybrid strain HA3518 is provided as a working example of the claimed tomato variety which is homozygous for the dg mutation, and having fruits with an average lycopene content of at least 200 ppm while being devoid of deleterious traits associated with the dg mutation. This example provides ample evidence that the Applicant is able to produce and was in possession of the claimed tomato

variety having the novel combination of the claimed characteristics as claimed in amended claim 1, at the time of filing. The example of hybrid HA3518 was produced with the exact detailed crossings, screening and selection procedures, disclosed and enabled in the application (steps 1 to 5 of the description and Examples 1-3, Figs 1 and 2) and resulted in tomato variety with the claimed characteristics of homozygosity for the dg mutation, average lycopene content of at least 200, while being devoid of deleterious traits associated with the dg mutation (Table 3, Figs 1 and 2). The following citations provide support for the above arguments:

*"Hybrid HA3518 serves as an example for the teaching of the present invention, and representatives of its seeds have been deposited with the ATCC on Jan. 29, 2004."*

p. 6, l. 25-27

*"According to one currently preferred embodiment, the present invention provides tomato hybrid seeds designated HA3518. Hybrid HA3518, representative seeds of which have been deposited with the ATCC on Jan. 29, 2004 (Accession number not available) serves as an example for the hybrids of the present invention, wherein the plants grown from the seeds are homozygous for the dg mutation, produce fruit crop yield comprising an average lycopene content of at least two fold its content in currently available crop yields, and is devoid of the dig associated undesired pleiotropic traits."*

p. 12, l. 23-29

More specifically, the specification of the filed application details the exact cross used for the production of the stable parent lines of the present invention, as cited below:

*"The stable parent lines of the present invention were developed from a cross between plants carrying the dg mutation (the dg mutant of L. esculentum cv Manapal) and a mixture of germplasm from proprietary and valuable breeding*



*material belonging to Hazera Genetics Ltd., the applicant of the present invention."*

Thus, the well characterized homozygous dg mutant Manapal, which encompass all pleiotropic deleterious traits associated with the dg mutation (Sacks E.K. and Francis, D.M. 2001. J. Amer. Hort. Sci. 126(2):221-226; Report of the tomato genetics cooperative, vol.58, September 2008, see Table 3) is used as a first parent line. In order to obtain the claimed plant devoid of the undesirable deleterious traits, the mentioned above mutant was crossed with a commercial tomato plant possessing mixture of germplasm comprising advanced commercial breeding material. Examples of such a plant include **Hypeel 287 or Asgro F2**.

In fact, these plants used in the cross to obtain the plant having the claimed characteristics are now claimed in amended claims 28 and 32.

In addition, Example 1 of the present application enables and teaches a person skilled in the art how to produce the tomato varieties with the claimed characteristics, including teaching how and which plants to select. More specifically, Example 1 details **specific steps**, for production of a tomato variety with the claimed characteristics, exemplified by HA3518 hybrid:

*"Seedlings obtained according to steps 1 to 5 described herein above served as **a source for the production of the HA3518 hybrid**.*

***Lines stabilized for the dg mutation were selected** as parent lines **The presence of the dg mutation was verified by PCR reaction using a dg-probe, and by the phenotypic effects of the mutation**.*

*This parent plants showed **normal growth pattern** with a **developed roots system** and **healthy leaves**, and produced **fruit containing lycopene content over 200 ppm**.*

*300 F1 hybrids were produced using these lines and other commercial valuable material. Eight hybrids were found to contain **high lycopene content (over 200 ppm)**, and **normal growth pattern**. The parent lines of these 8 selected*

*hybrids were self pollinated and planted for sufficient number of generations to obtain stabilized parent plant, homozygous for the dg mutation while devoid of: poor germination rate; shallow root system; brittle stems; thin and/or fragile leaves; small fruit; low crop yield. The eight hybrids were then produced again using the stable parent lines, hybrid HA3518 serving as a representative example.*

*The stable parent from which this HA3518 hybrid was produced were further self-pollinated and selected for best-performing plants in terms of horticulture measures. The new stabilized parents were used to produce a second generation of hybrid HA3518, representative seeds of which have been deposited with the ATCC on Jan. 29, 2004.*

In the above citation the traits and parameters used to select the tomato plants with the claimed characteristics are defined, and as extensively explained above these traits are acceptable in the relevant literature to be used for the aforementioned purpose of testing tomato varieties for absence of deleterious traits and adaption for growth on commercial scale.

The standard for determining whether the specification meets the enablement requirement was cast in the Supreme Court decision of *Mineral Separation v. Hyde*, 242 U.S. 261, 270 (1916) which postured the question: is the experimentation needed to practice the invention undue or unreasonable? See also *United States v. Telectronics, Inc.*, 857 F.2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988) ("The test of enablement is whether one reasonably skilled in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation."). A patent need not teach, and preferably omits, what is well known in the art. *In re Buchner*, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947 (1987); and *Lindemann*

*Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1463, 221 USPQ 481, 489 (Fed. Cir. 1984).

It is important to note, the fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation. *In re Certain Limited-Charge Cell Culture Microcarriers*, 221 USPQ 1165, 1174 (Int'l Trade Comm'n 1983), *aff'd. sub nom., Massachusetts Institute of Technology v. A.B. Fortia*, 774 F.2d 1104, 227 USPQ 428 (Fed. Cir. 1985). See also *In re Wands*, 858 F.2d at 737, 8 USPQ2d at 1404. Again, the test of enablement is not whether any experimentation is necessary, but whether, if experimentation is necessary, it is undue. *In re Angstadt*, 537 F.2d 498, 504, 190 USPQ 214, 219 (CCPA 1976).

There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988) (reversing the PTO's determination that claims directed to methods for detection of hepatitis B surface antigens did not satisfy the enablement requirement).

Based on the above arguments, amendments to the claims and citations Applicant respectfully submits that the present specification provides sufficient guidance and tools to enable one skilled in the art of plant breeding, *not only* to produce the specific deposited HA3518 hybrid, but to further produce other tomato varieties having the claimed dg homozygosity, fruits having lycopene content of at least 200 ppm and absence of deleterious traits associated with the dg mutation (i.e. HA3512, HA3513 of Table 3), without undue experimentation.

The disclosure of the present application provides a person skilled in the art of plant breeding sufficient teaching to make and/or use the invention, namely the crossings, selection and screening steps performed to reach the claimed tomato variety adapted for growth on a commercial scale homozygous for the dg mutation, devoid of the deleterious traits linked to the mutation, as cited below:

*"The development of a commercial, superior tomato variety requires a significant breeding effort, especially what was required to break the linkage between the dg locus and the associated deleterious genes."*

p. 9 l. 3-5

The claims are now specifically directed to a robust, hardy, vigorous tomato variety adapted for growth on a commercial scale, having the properties set forth in amended claim 1. Applicant fully describes the varieties in the specification and provides working examples, including biological seed deposit.

While some routine task and breeding are always required in producing any new variety, the present application provides sufficient direction and examples such that no undue experimentation would be required by a tomato breeder (one skilled in the art). Furthermore, with the tools, teachings and working examples provided by the Applicant, one skilled in the art of plant breeding would have a reasonable expectation of success of producing the claimed tomato varieties.

Therefore it is respectfully submitted that, in view of the above, claims 1-5, 8-12, 15-25, 28-32 and 35-38 as amended comply with the enablement requirement under 35 U.S.C. § 112, first paragraph.

Claims 1-5, 8-12, 15-25, 28-32 and 35-38 were rejected under 35 U.S.C. § 112, first paragraph, for failure to meet the written description requirement for the reasons set for on pages 8-10 of the Office Action.

Applicant respectfully traverses this rejection and points out that hybrid HA3518 is a representative example of the genus of tomato varieties claimed. The Applicant shows possession by describing the claimed invention with all of its limitations using such descriptive means as words, structures, figures, diagrams and formulas that fully set forth the presently claimed invention (*Lockwood v. American Airlines, Inc.*, 107 F.3d 1565, 1572, 41 USPQ2d 1961, 1966 (Fed. Cir. 1997)). The claims are now specifically directed to a robust, hardy, vigorous tomato variety adapted for growth on a commercial scale, homozygous for the dg mutation, wherein tomatoes grown from this variety have an average lycopene content of at least 200 ppm plus or minus the standard error from the mean, while being devoid of deleterious traits associated with the dg mutation, when measured at peak lycopene content. In the specification of the filed application, hybrid HA3518 is provided as a working example of the claimed tomato variety (Example 1). This example provides ample evidence that the Applicant is able to produce

and was in possession of the claimed tomato variety having novel combination of the claimed characteristics, as claimed in amended claim 1, at the time of filing.

The example of hybrid HA3518 was produced with the exact detailed crossings, screening and selection procedures disclosed and enabled in the application (steps 1 to 5 and Examples 1-3), and resulted in the tomato variety with the claimed characteristics, exemplified by hybrid HA3518. The following citations support the above arguments:

*"The stable parent lines of the present invention were developed from a cross between plants carrying the dg mutation (the dg mutant of L. esculentum cv Manapal) and a mixture of germplasm from proprietary and valuable breeding material belonging to Hazera Genetics Ltd., the applicant of the present invention."*

*"The resulting progeny from this cross are then crossed again to the recurrent parent and the process is repeated until a tomato plant is obtained wherein essentially all of the desired morphological and physiological characteristics of the recurrent parent are recovered in the converted plant, in addition to the single transferred gene from the nonrecurrent parent. Backcrossing methods can be used with the present invention to improve or introduce a characteristic into the parent lines."*

*"Pollen and ovules from these tomato plants; the seeds produced from same and the plants grown from the seeds; plants regenerated from tissue cultures regenerated from the plants of the present invention; and plants or parts thereof having all of the physiological and morphological characteristics of the tomato plants of the present invention are also encompassed within the scope of the present invention."*

*"Hybrid HA3518, seeds of which have been deposited with the ATCC on Jan. 29, 2004 serve as an example for the teaching of the present invention."*

*"Hybrid HA3518, representative seeds of which have been deposited with the ATCC on Jan. 29, 2004 (Accession number not available) serves as an example for the hybrids of the present invention, wherein the plants grown from the seeds are homozygous for the dg mutation, produce fruit crop yield comprising an average lycopene content of at least two fold its content in currently available crop yields, and is devoid of the dg associated undesired pleiotropic traits."*

In addition, the disclosure of the present application provides further characteristics of hybrid HA3518 such as fruit yield, Brix and pH (Example 2. Table 3) and compares it with available commercial varieties (Fig. 2). These characteristics are claimed in new claims 39- 41.

With respect to claims 15-27, 29, 30-31 and 36-38 drawn to F1 and F2 progenies of hybrid HA3518, it is submitted that the claimed F1 and F2 plants are identified by the all the characteristics of HA3518 as explicitly detailed in the citations of the specification below:

*"Pollen and ovules from these tomato plants; the seeds produced from same and the plants grown from the seeds; plants regenerated form tissue cultures regenerated from the plants of the present invention; and plants or parts thereof having all of the physiological and morphological characteristics of the tomato plants of the present invention are also encompassed within the scope of the present invention."*

P. 5 l. 8-12

*"The present invention also relates to seeds harvested on the F1 hybrid tomato plants and plants grown from these seeds. A common practice in plant breeding is using the method of backcrossing to develop new varieties by single trait conversion. The term single trait conversion as used herein refers to the incorporation of new single gene into a parent line wherein essentially all of the*

**desired morphological and physiological characteristics of the parent lines are recovered in addition to the single gene transferred.**"

p. 13 l. 14-20

*"The resulting progeny from this cross are then crossed again to the recurrent parent and the process is repeated until a tomato plant is obtained **wherein essentially all of the desired morphological and physiological characteristics of the recurrent parent are recovered in the converted plant,** in addition to the single transferred gene from the nonrecurrent parent. Backcrossing methods can be used with the present invention to improve or introduce a characteristic into the parent lines"*

p. 13, l. 29-33; p. 14 l. 1-2

*"Once the parent lines that give the best hybrid performance have been identified, the hybrid seed can be produced indefinitely, **as long as the homogeneity and the homozygosity of the parents is maintained.**"*

p. 9 l. 24-26

Furthermore, the claims now require progenies of hybrid HA3518 to retain all the morphological and physiological characteristics of the hybrid parent HA3518, as claimed in amended claims 15, 26, 27, 29, 30 and 37.

In view of the claim amendments, examples, biological seed deposits and detailed disclosure providing all of the claimed variety characteristics, one skilled in the art would reasonably believe that Applicant was in possession of the invention as presently claimed at the time of filing. Applicant therefore respectfully requests that this rejection be withdrawn.

In addition, the single gene conversion set forth in presently pending claim 37 is explicitly disclosed in the specification and the plant comprising a transformed gene preserves all the morphological and physiological characteristics of the parent lines, as outlined below. Claim 37 has been amended accordingly.

*"The term single trait conversion as used herein refers to the incorporation of new single gene into a parent line wherein essentially all of the desired morphological and physiological characteristics of the parent lines are recovered in addition to the single gene transferred."*

p. 13 l.16-20

*"The resulting progeny from this cross are then crossed again to the recurrent parent and the process is repeated until a tomato plant is obtained wherein essentially all of the desired morphological and physiological characteristics of the recurrent parent are recovered in the converted plant, in addition to the single transferred gene from the nonrecurrent parent."*

p. 13 l. 29-33

The transformed gene is defined as selected from a group consisting of "herbicide resistance, insect resistance, resistance to bacterial, fungal or viral disease and male sterility as claimed in amended claim 39 and disclosed in the specification:

*"According to one embodiment, the transformed gene or genes confer a characteristic selected from the group consisting of herbicide resistance, insect resistance, resistance to bacterial, fungal or viral disease, male sterility and improved nutritional value."*

p. 7 l. 28-31

Thus, it respectfully requested that presently pending claim 37 be allowed as well.

### **35 U.S.C. § 102 and 103 Rejections**

Claims 1-5, 8-12, 15-17, 24-25, 28-32, 36 and 37 were rejected under 35 U.S.C. § 102(e) or alternatively under 35 U.S.C. § 103(a) as obvious over Levin et al. Claims 31 and 36-38 were rejected under 35 U.S.C. § 102(b). Claims 1-5, 8-12, 15-25, 28-32 and 36-38 were alternatively



rejected under 35 U.S.C. § 103(a) as obvious over Levin et al. in view of Hoogstraten. Applicant respectfully traverses.

Applicant submits herewith amended claims that are directed to a robust, hardy, vigorous tomato variety adapted for growth on a commercial scale. The tomato variety is characterized by homozygosity for the dg mutation, lycopene content of at least 200 ppm, and absence of deleterious traits associated with the dg mutation.

It is respectfully submitted that a tomato variety possessing this combination of characteristics is novel and nonobvious over the prior art. The absence of deleterious traits associated with the dg mutation is verified by the high yield of the variety claimed in the present invention (Figs. 1 and 2):

*"The average crop yield of hybrid HA3518 was 10.8 Kg/m<sup>2</sup>, **which is considered as average to high yield for a commercial variety.**"*

p. 17 l. 4-5

Furthermore, Applicant attaches to this document experimental data showing the superiority of the claimed tomato variety over the homozygous dg mutant LRT 915 of Levin et al. (WO 03/057917) (Appendix IV).

Levin's et al. disclosure is directed to the characterization of the dg mutation and provides means and methods for detecting said mutation. The disclosure of Levin et al. does not provide homozygous dg mutant plants which are adapted for growth on a commercial scale and/or comprise fruit yield of at least 9 kg/m<sup>2</sup>. Levin et al. does not teach or suggest products with a break of the known linkage between the dg mutation and the undesired pleiotropic traits which include low yield, poor germination rate, brittle stems, fragile leaves, small fruits, shallow root system and premature defoliation, nor does Levin teach or suggest methods for achieving this breakage. Applicant was the first to disclose and enable these features and characteristics.

The experimental data showing that Levin's tomato mutants are pleiotropic is provided herewith (Appendix IV). In these experiments, performed on 2002 by the Applicant, a comparison of various pleiotropic traits associated with the dg mutation, of LRT915 of Levin et

al. (Table 1 of Appendix IV) and the deposited hybrid HA3518 of the present application, was made. Based on repeated observations, it was found that LRT915 is pleiotropic with respect to the following traits and/or phenotypes: appearance of sensitive and fragile leaves, sudden leaf death, brittle stems, poor root system, two weeks earlier rotting fruits and lower seed germination rate (Table 1 of Appendix IV). In addition, a comparison of fruit yield and lycopene content of LRT915 and HA3518 was performed at several distinct locations and environmental conditions in Israel. The results presented conclusively show that HA3518, which is an example of the tomato varieties claimed in the currently submitted claim 1, is superior in higher yield and higher lycopene relative to the cited strain of Levin (LRT915) (Appendix IV). Furthermore, the lycopene concentration of the LRT915 tomato fruits in all locations examined was lower than 200 ppm, while the average HA3518 lycopene concentration is higher than 200 ppm, as claimed in the currently submitted claim 1.

Thus, HA3518, the exemplary variety of the invention has a proven high yield, high germination rate, good fruit quality, strong root system, strong foliage, and fruits that rot at least two weeks later than LRT915. The Applicant wishes to stress that HA3518 does not suffer from the attendant pleiotropic effects found in the high lycopene prior art LRT915, and this is because the invention of the present application is the breakage of the link between dg and the pleiotropic traits.

In view of the above experimental data and arguments, it is respectfully submitted that the present application is novel and inventive over the cited WO 03/057917 document (Levin). It is also submitted that the currently amended claims are novel and inventive over Hoogstraten as well. Neither Levin nor Hoogstraten, alone or in combination, teach or suggest the presently claimed invention e.g., a tomato variety, wherein the plants are homozygous for the dg mutation and retains all of the physiological and morphological characteristics of the deposited HA3518 line (claims 15, 26, 27, 29, 30 and 38)

Therefore, for all the above reasons, the Applicant respectfully requests that the rejections under 35 U.S.C. §§ 102 and 103 be withdrawn and the claims as presently pending be allowed.

**CONCLUSION**

In view of the foregoing amendments and remarks, the pending claims are deemed to be allowable. Their favorable reconsideration and allowance is respectfully requested. If the Examiner has any remaining questions or concerns, please contact Applicant's representative at (602) 916-5404 to expedite the allowance of the application.

Respectfully submitted,

June 1, 2011  
Date

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